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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,655	04/16/2004	Ramon A. Gomez	1875.5200000	8481
26111	7590	08/21/2006	EXAMINER	
STERNE, KESSLER, GOLDSTEIN & FOX PLLC 1100 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			NGUYEN, SIMON	
			ART UNIT	PAPER NUMBER
			2618	

DATE MAILED: 08/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/825,655	GOMEZ ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	SIMON D. NGUYEN	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 16 April 2004.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-26 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 16 April 2004 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_.
- 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

1. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the submitted drawings are informal. Applicant is advised to employ the services of a competent patent draftsperson outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 1-2, 17-18 are rejected under 35 U.S.C. 102(a) as being anticipated by Otaka (2003/0007377).

Regarding claims 1, Otaka discloses a mixer (figs.10, 13, 14A-B), comprising: an input transistor pair (Q40-43, 48-49) for receiving a baseband signal (RF+-) and a LO signal (LO +,-) ; a plurality of submixers ( transistor pairs Q40-41; Q 42-Q43; Q44-Q45; Q 46-Q47) coupled in parallel for mixing the baseband signal and the LO signal; and a

tail current source (lo) to supply power; wherein the plurality of submixers share the input transistor pair and the tail current source (paragraphs 78-85, 97-112).

Regarding claim 2, Otaka further discloses the LO dividing a plurality of individual LO waveforms (paragraphs 31, 34-36, 39, 50, 52, 62, 75, 84, 91-92, 99, 109, 110-112).

Regarding claims 17-18, these claims are rejected for the same reason as set forth in claims 1-2, respectively.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3, 19, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otaka (2003/0007377).

Regarding claim 3, 19, Otaka discloses a phase shift for differing between the waveforms (figs. 10, 13, 14A-B, paragraphs 31, 34-36, 39, 50, 52, 62, 75, 84, 91-92, 99, 109, 110-112). It should be noted that in order for a double balanced mixers functioning properly, a phase difference between any two time-adjacent individual LO waveforms is approximately equal to a phase difference between any other two time-adjacent individual LO waveforms in the plurality of LO waveforms which is known to those skilled in the art in order to prevent an overlapping LO signals as well to reduce noise or interference.

Regarding claim 23, this claim is rejected for the same reason as set forth in claims 1 and 3.

6. Claims 4-7, 9-13, 15-16, 20-22, 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otaka (2003/0007377) in view of Kizer (2005/0206416).

Regarding claim 10, Otaka discloses a RF mixer, comprising: inputting an input signal (RF in) to a plurality of sub-mixers (fig.10); driving a switch (SW1, SW2) on each submixer; mixing the input signal with the plurality of individual LO signal (LO+-) in active sub-mixers; summing outputs of each of the plurality of sub-mixers to generate a final output signal (I out) (figs 10). However, Otaka does not specifically disclose that only one of the sub-mixer is active at a time.

Kizer discloses a mixer, comprising: an RF input, LO input, and, a switch on each of the sub-mixers (figs. 4, 7) such that only one submixer is in active at a time (paragraph 58). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have Otaka, modified by Kizer to reduce noise that may produce in the mix LO signals in order to improve the performance.

Regarding claims 4-6, 11, 13, 20-21, 24-26, Otaka does not specifically disclose a phase shift of 45 degrees, square root, and the oscillating signals do not overlap.

Kizer discloses a mixer having a phase difference of 45 degrees and the LO waveforms do not overlap (figs.4, 7, 10, paragraphs 78-79, 85, 160), wherein Kizer further discloses more than six submixers (fig.7) and a square root of 2 (paragraph 134). Therefore, it would have been obvious to one skilled in the art at the time the

invention was made to have Otaka, modified by Kizer to reduce noise that may produce in the mix LO signals in order to improve the performance.

Regarding claims 9, 22, Kizer discloses that only one submixer is in active at a time (paragraph 58).

Regarding claim 12, this claims is rejected for the same reason as set forth in claim 3.

Regarding claims 15-16, Otaka further discloses the input signal is an RF baseband signal and the out signal is an IF signal (paragraph 109, fig.15). The input signal is an IF signal and the output signal is an RF baseband signal (paragraph 112, fig.15).

7. Claims 8, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otaka (2003/0007377) in view of Kizer (2005/0206416), and further in view of Rofougaran et al. (2005/0186930).

Regarding claims 8, 14, the modified Otaka does not specifically disclose square waves.

Rofougaran discloses a mixer having LO signals, wherein the LO signals are square waves (paragraphs 117, 224, 326, 330, 332), and outputs of the mixer are scaled by square root (since there are two transistors, the square root should be divided by 2)(paragraph 210). It should be noted that the LO signal comprises eight square waves summed into a piecewise signal is known to those skilled in the art. Therefore, it

would have been obvious to one skilled in the art at the time the invention was made to have modified Otaka, modified by Rofougaran to reduce the amplitude imbalance.

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Luff et al. (7,027,792) discloses a mixer (fig. 4), comprising: an input transistor pair for receiving a baseband signal (RF+-) and a LO signal (LO +,-) ; a plurality of submixers coupled in parallel for mixing the baseband signal and the LO signal; and a tail current source to supply power; wherein the plurality of submixers share the input transistor pair and the tail current source (fig.4, paragraphs 23-30); Yamaguchi et al. (6,628,343) discloses a mixer having input signals to receive a RF signal; input signals to receive LO signals with a phase shift of 45 degrees, generate output signal as the sum of the plurality of submixers (figs.5, 12, para. 83); Hatcher et al. (2002/0193089) discloses a mixer having input signals to receive a RF signal; input signals to receive LO signals, generate output signal as the sum of the plurality of submixers figs. 1-2, paragraphs 14-18, 38-41); Lee (2002/0004376) discloses a mixer having input signals to receive a RF signal; input signals to receive LO signals, generate output signal as the sum of the plurality of submixers (figs. 4-8); Kimura (2003/0119474) discloses a mixer having input signals to receive a RF signal; input signals to receive LO signals, generate output signal as the sum of the plurality of submixers (figs. 14a-b, paragraph 100)

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Simon Nguyen whose telephone number is (571) 272-7894. The examiner can normally be reached on Monday-Friday from 7:00 AM to 4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward F. Urban, can be reached on (571) 272-7899.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 306-0377.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks  
600 Dulany, Alexandria, VA 22314

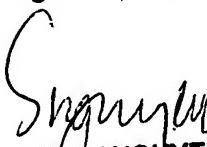
Or faxed to:

(571) 273-8300 (for formal communications intended for entry)

Hand-delivered response should be brought to Customer Service Window located at the Randolph Building, 401 Dulany, Alexandria, VA, 22314.

Simon Nguyen

August 9, 2006

  
SIMON NGUYEN  
PRIMARY EXAMINER